

Education and Research at NMT:

- Biomass chemistry and modification.
- Biorefinery technology
- Paper and board coating, converting, and printing



www.abo.fi/traochpapperskemi

Molecular process technology & analysis







Paper Coating and Converting www.abo.fi/LPCC

Surface engineering for functional natural fiber-based products



Biomass engineering & topochemistry



Laboratory of Natural Materials Technology 20

naturmaterialteknik

Prof. X.Y. & Dr. Jan Gustafsson Fibre and Cellulose Technology

Biomass engineering & topochemistry

Prof. Chunlin Xu & Dr. Anna Sundberg Wood and Paper Chemistry

Molecular process technology & analysis

Prof. Martti Toivakka & Dr. Mari Nurmi Paper Coating and Converting

Surface engineering for functional natural fiber-based products



- ~6 post doc researchers
- 40 peer-reviewed journal articles/year
- ~45 PhD-degrees during 2010-2020
- 2 previous Academy of Finland Centers of Excellence:
 - Process Chemistry Center
 - Center for Functional Materials



Research topics and projects

Åbo Akademi University

Biomass fractionation, lignin chemistry and valorization

- Novel biomass fractionation approach (Academy of Finland)
- Novel fiber surfaces functionalized by lignins (Business Finland, with Patrik Eklund)
- Lignin for resins, surfactants, and nanoparticles (Other foundations)

Bioplastics, packaging, and functional materials

- Sustainable binders & coatings (Business Finland)
- Sustainable energy storage solutions (JAES, PI: Johan Bobacka)
- Fiber and cellulose-based functional materials (Other foundations)









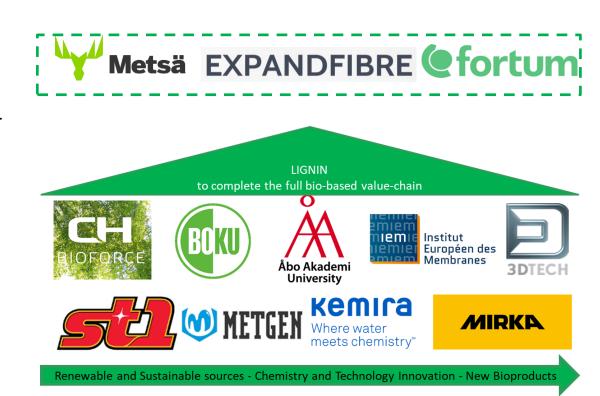
Novel Fiber Surfaces Functionalized by Lignins Refined and **Engineered from Finnish Biorefinery Processes (LigninReSurf)** Business Finland, 2021-2023 Åbo Akademi

Project team

- Luyao Wang, Oskar Backman, Lulu Zhu, Liqiu Hu, Niklas Heikola, Chunlin Xu
- Lucas Lagerquist, Patrik Eklund
- Prof. Thomas Rosenau, Wood, Pulp and Fiber Chemistry, BOKU University, Austria
- Prof. Denis Bouyer, Membrane Technology, Université Montpellier, France

Objectives

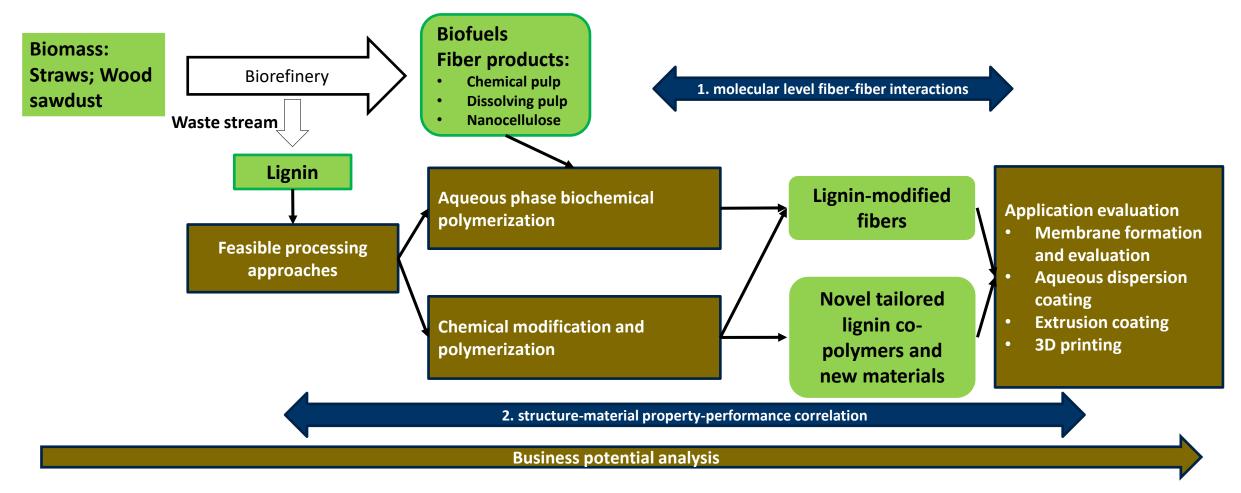
- to develop high performance lignin-based copolymers and materials:
 - Novel bio-based porous membranes,
 - New aqueous dispersion coating formulations, and
 - New thermoplastic materials



University

Existing and new value chains





Sustainable Binders and Coatings (SUSBINCO) Business Finland Co-Innovation, 2021-2023



Objectives

- to develop biobased alternatives for fossil-based binders and coatings in different applications that are sustainable and safe
 - To develop hemicellulose and ligninbased surfactants
 - to formulate and evaluate water dispersions for coating applications using bio-based binder compounds





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Paper Coating and Converting: Prof. Martti Toivakka







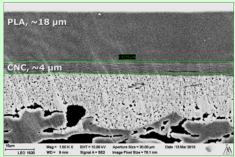


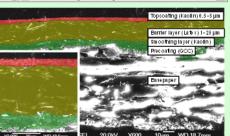


Packaging



Bio-based barriers and functional coatings





Surface Engineering for Functional Substrate compatibility **Natural** Fibre-based
Products

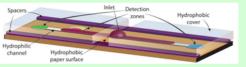
Products

Adhesion - Optics - Biochemistry - Optics - Biochemistry - Adhesion - Optics - Biochemistry - Adhesion - Optics - Biochemistry - Adhesion - Optics - Biochemistry -

Mechanical properties

Paper electronics





and sensors

Composites

Partier properties

Nanoparticles & -coatings

Porous media

Simulation

